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ORIGINAL RESEARCH

Awareness and attitude of maxillofacial surgeons in India towards prosthetic rehabilitation after ablative jaw surgery

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ABSTRACT

Purpose: The study investigated the awareness and attitude of maxillofacial surgeons towards prosthetic rehabilitation after ablative jaw surgery.

Materials and Methods: A questionnaire-based survey using google forms was designed to assess the awareness and attitude of maxillofacial surgeons. The questionnaire comprising of 23 closed-ended and multiple-choice questions. A total of 150 forms were sent to maxillofacial surgeons through e-mail.

Results: Upon analyzing 103 responses it was observed that in the case of maxillectomy defects, the size of the lesion was designated as the most common factor (87%) for deciding between surgical reconstruction or prosthetic rehabilitation. 89% of respondents agreed that presurgical consultation with a maxillofacial prosthodontist could improve the rehabilitation success rate. The most common modality used for the reconstruction of mandibulectomy defects is vascularized bone grafts (32 %), reconstruction plate (30 %), and locoregional flaps for reconstruction by 20% of surgeons. Speech (64.1%) and nasal regurgitation (62%) were the two most important functions that the patient demanded to be corrected after maxillectomy whereas after mandibulectomy masticatory difficulties faced by the patient were the primary reason for seeking the prosthesis as suggested by 84% of respondents.

Conclusion: The findings of this study show lack of awareness among surgeons regarding prosthetic rehabilitation of the post jaw resection patients. Ablative tumors of jaws necessitate a multidisciplinary team approach due to their effects on the functional and esthetic aspects of the patients involved. The response also emphasizes the need for a maxillofacial prosthodontist in the complete rehabilitation of the patients. (*Int J Maxillofac Prosthetics 2023;6:8-15*)

Keywords

Awareness, maxillofacial surgeons, prosthetic rehabilitation, ablative jaw surgery.

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AUDIO ABSTRACT

INTRODUCTION

Gnathic bones including maxilla and mandible are crucial in maintaining facial contour, ensuring mastication and speech. Head and neck tumors are predominantly comprised of carcinoma, odontogenic cyst, and tumors. 57.5% of all head and neck cancer occur in Asia out of which India accounts for 30%.[1] Prevalence of odontogenic cyst and tumor in Indian population were 6.7% and 6.2% respectively.[2] Surgery is the primary treatment. However, it severely compromises the esthetics and function. Therefore, reconstruction is essential to preserve the functions.

Maxillectomy involves the removal of all or part of the maxilla bone due to tumors of the hard palate, nose, and maxillary sinus. Defects of maxillectomy compromise facial aesthetics and suboptimal oral function.[3,4] Unilateral maxillectomy defects can be effectively obturated and may cause the patient functional or cosmetic embarrassment. A maxillectomy associated with the exenteration of the orbit will result in a major cosmetic change for the patient and potential difficulties with obturation.[5] Iyer and Thankappan in a review paper have presented an algorithm for the reconstruction of maxillectomy defects.[6]

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Brandao et al. in a systematic review assessed the approach to improve the quality of life after maxillectomy. They compared obturator prostheses versus free tissue transfer and no significant difference was found between the two modalities.[7]

The need for mandibular reconstruction arises from the loss of mandibular bone due to benign or malignant tumors, trauma, or infectious cysts. Mastication, speech, and aesthetics are severely affected without reconstruction. The goal of mandibular reconstruction is to reestablish facial form and function. The current techniques of mandibular reconstruction comprise free bone grafts, pedicled bone grafts, reconstruction plates, and microvascular free flaps.[8]

The involvement of the multidisciplinary team to explain the different treatment options to patients and provide holistic care is of paramount importance. The multidisciplinary team comprises a maxillofacial surgeon, maxillofacial prosthodontist, speech therapist, and psychological counselor.[9]

To enhance the quality of life of the patients after surgical resection operating surgeons must be aware of the prosthetic rehabilitation options. The purpose of the present study was to investigate the awareness and attitude of maxillofacial surgeons toward the prosthetic rehabilitation of patients after ablative jaw surgery.

MATERIALS AND METHODS

A questionnaire-based survey using Google forms was designed to assess the awareness and attitude of maxillofacial surgeons regarding rehabilitation after ablative surgery. The questionnaire comprising of 23 closed-ended and multiple-choice questions in three different sections demographics, maxillectomy (Appendix 1), and mandibulectomy (Appendix 2). The questionnaire was validated with expert validation and peer validation. Ethical approval for the study was obtained from the Institutional Review Board of the Institute of Dental Sciences (IDS) Bhubaneswar, India (No. SOA/IDS/IRB2021/3B).

A total of 150 forms were sent to maxillofacial surgeons through e-mail. The purpose of the study was well explained to each respondent. The primary objective of the study was to assess the awareness and attitude of surgeons in India when rehabilitating patients after ablative jaw surgery. The secondary objective was to know about the factors which affect the surgeons' treatment plan and how it affects the rehabilitative procedure.

RESULTS

One hundred fifth questionnaires were distributed and 103 responses were obtained with a response rate of 68%. The responses were recorded in the excel spreadsheet (Microsoft Corporation).

Respondents included 67 males and 36 females with a median age of 43 years (range 23-63 years). 77.7% of respondents worked in the educational institution and the rest were private practitioners. 73% of respondents performed one to five maxillectomies in a year. Only 13 % have done more than 10 maxillectomy cases. The necessity for classifying maxillectomy defects was realized by 83.5% of respondents (Fig. 1).

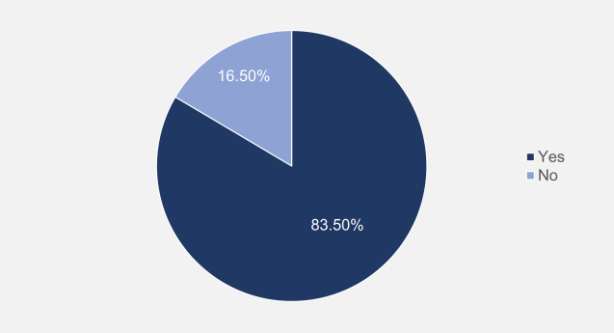

Fig 1. Shows the respondents who classify maxillectomy defects.

The most common flap used for reconstruction was the temporalis flap (51.5%) followed by the radial forearm flap (16 %), fibula-free flap (13.6%), and deep circumflex iliac flap (5%). The size of the lesion (84.5 %) was designated as the most common deciding factor amongst surgical reconstruction or prosthetic rehabilitation, followed by the tendency for recurrence (50%), nature of the lesion (48.5%), and the number of remaining teeth 25%.

Only 26 % of respondents affirmed that patients were always dentally rehabilitated following surgical reconstruction but 70 % were unsure about the complete dental rehabilitation of the patient. 32 % of respondents agreed to a multidisciplinary approach.

Presurgical consultation with a maxillofacial prosthodontist could improve the rehabilitation success rate agreed by 89% of respondents. 71% of maxillofacial surgeons contemplate that an interim/surgical prosthesis ensures a better fit of the definitive prosthesis. 50% think that prior consultation with a prosthodontist could help in deciding whether to reconstruct surgically or rehabilitate with a prosthesis. 30% think that prior consultation with a maxillofacial prosthodontist will help in preserving some key teeth required for rehabilitation (Fig. 2).

The speech was the most important function that the patient demanded to be corrected after maxillectomy as stated by 64.1% of respondents. This is closely followed by nasal regurgitation 62.1% and mastication 55.3% (Fig. 3).

Rehabilitation by implants was opted for by only 18% of respondents while the majority 64.1% decided according to the affordability of the patient.

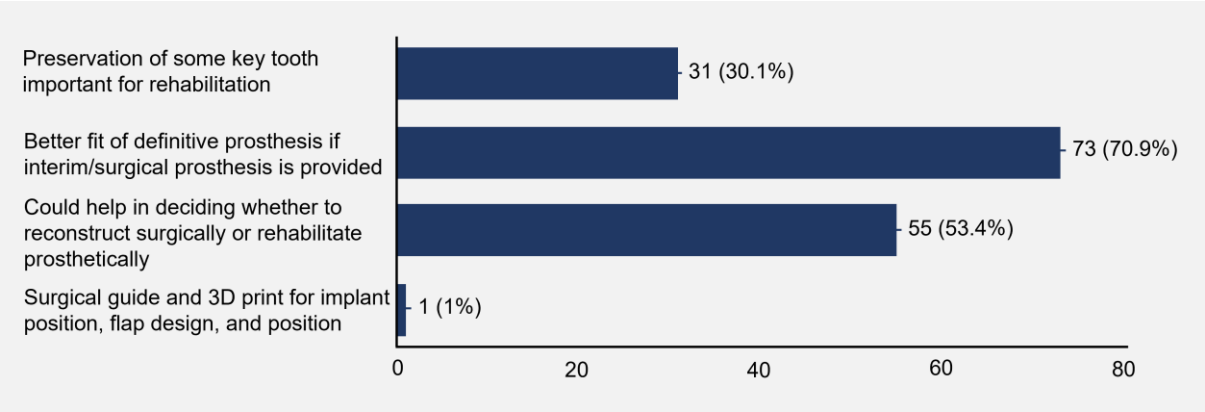
Preservation of some key tooth important for rehabilitation
31 (30.1%)
Better fit of definitive prosthesis if interim/surgical prosthesis is provided
73 (70.9%)
Could help in deciding whether to reconstruct surgically or rehabilitate prosthetically
55 (53.4%)
Surgical guide and 3D print for implant position, flap design, and position
1 (1%)
0
20
40
60
80

Fig 2. Improvements obtained by prior consultation with a maxillofacial prosthodontist.

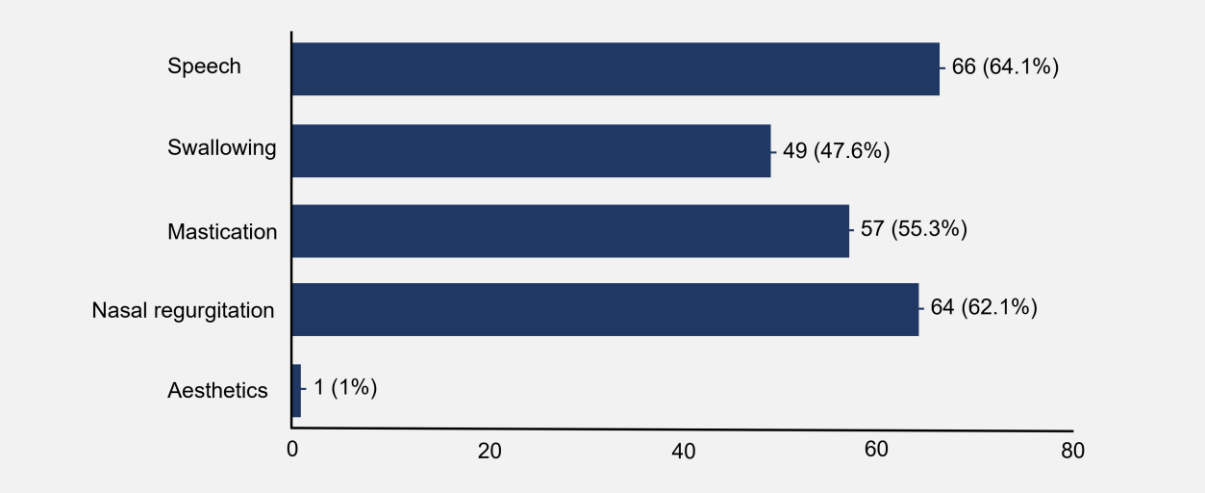

Fig 3. The most important oral functions that your patient demand to be corrected after maxillectomy.

Forty percent of maxillofacial surgeons treat 1-5 cases of mandibulectomy in a year while 35% performed more than 10 cases in a year. The most common modality used for the reconstruction of mandibulectomy defects is vascularized bone grafts 32% closely followed by reconstruction plate by 30%, and locoregional flaps for reconstruction by 20% of surgeons (Fig. 4). Facilities for a vascularized bone graft are not available in about 37% of centers.

The most common deciding factor for the reconstruction of a mandibulectomy defect is the cost of the treatment. The second and third common factors are associated with co-morbidity and the age of the patient respectively (Fig. 5).

Masticatory difficulties faced by the patient were the primary reason for seeking the prosthesis after mandibulectomy suggested by 84% of respondents. Other reasons were esthetics, deviation of the mandible, and speech (Fig. 6).

Quality of life of the patient is very important for 77.8% of respondents but due to the high volume of the patient in their center, many must weigh between the quantity and quality of the resection.

DISCUSSION

The classification of maxillectomy defect combines both the possible functional and aesthetic outcomes and determines a relationship with rehabilitation options. It provides a systematic outline to explain the complexity of each defect and the associated problem it carries for reconstructive options. Classification of the maxillectomy defect provides an algorithm to treat different classes of the defect. Prosthodontists, commonly use Aramany's classification which was developed for framework designing for obturator prosthesis in partially edentulous patients.[10] It considers differences of mechanics involved in 6 classes of obturator framework.

In Brown's Classification, the surgical defect is classified according to the vertical dimension of the maxillectomy (Class 1–4), which relates to the involvement of the orbit and skull base and the resultant aesthetic deformity. Class 2–4 in addition have a horizontal or palatal aspect of the maxillectomy, including the nasal septum, contralateral sinuses, and alveolus that have been excised. This horizontal component more closely relates to the functional and dental outcomes of these patients.[11]

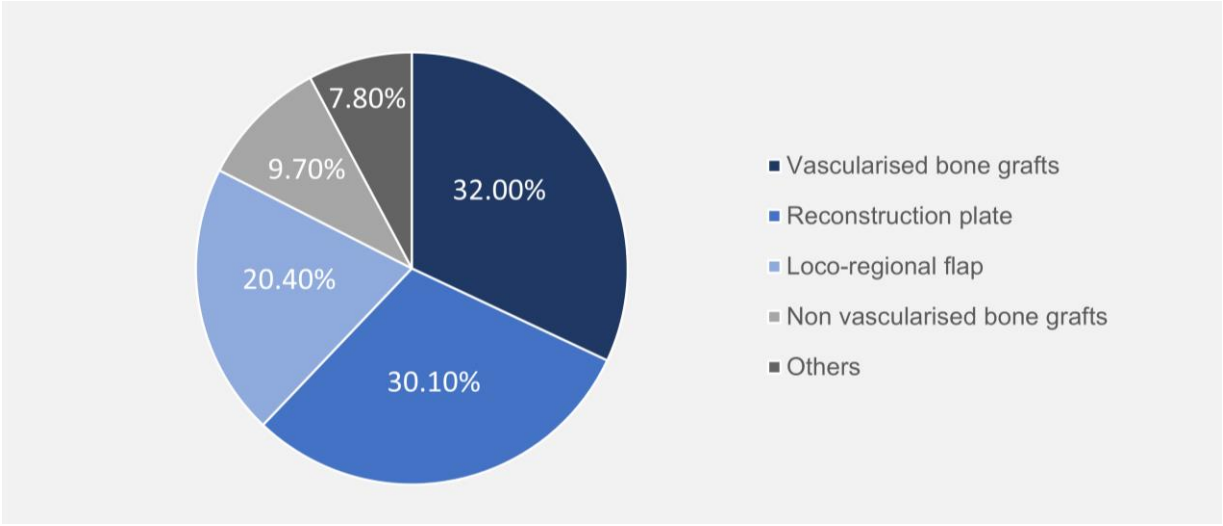

Fig 4. Modality used for reconstruction of mandibular defects.

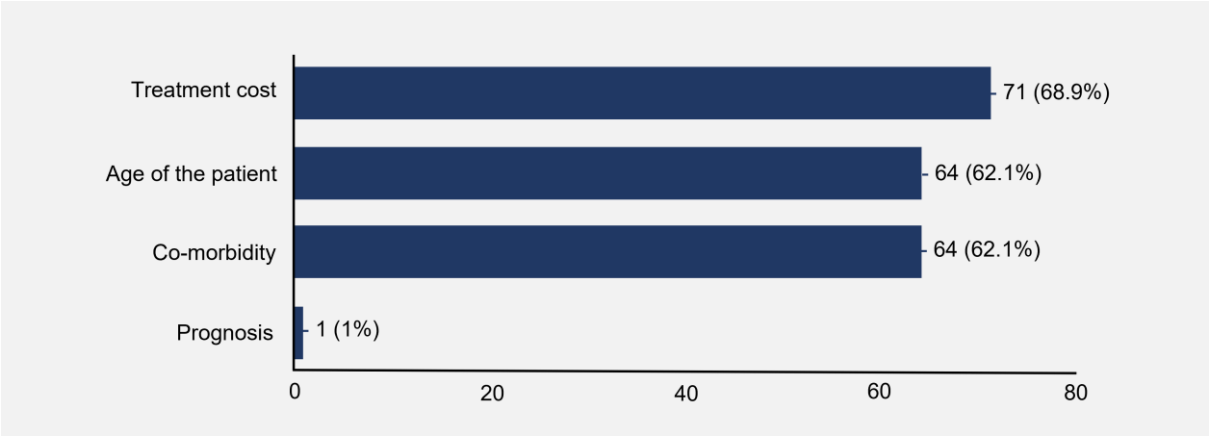

Fig 5. Factors that affect reconstruction plan in mandibular defect.

Sixteen and half percent of oral surgeons in our study do not classify the maxillectomy defects before surgery which shows a lack of awareness among surgeons about rehabilitation choices. The role of multidisciplinary team is paramount in achieving rehabilitation goals. Inclusion of maxillofacial prosthodontist in the team from the beginning will help in pretreatment planning for effective rehabilitation.[12] 32% of respondents affirmed that patients are always seen in multidisciplinary clinic while 61% responded that sometimes patients are seen in multidisciplinary clinic. The similar results were seen in a study by Elbashti et al.[13]

Okay et al.[14] have proposed a classification system for the reconstruction of maxillary defects based on the defect size in the horizontal planes. This classification system mainly considers the obturator stability and retention. It also facilitates surgical planning among surgeons to facilitate functional rehabilitation.

The size of the lesion was designated as the most important and the tendency for recurrence second most important factor in our study when considering between surgical reconstruction or prosthetic obturation. Literature also suggested the size of the lesion as the most important factor which decides whether to reconstruct using flaps or obturate with a prosthesis.[15] The obturator has some noticeable advantages: relatively simple surgery, immediate new dentition which restores function and appearance, and allows easy visualization of the defect. Although an obturator is possible for any defect, its use becomes problematic in more extensive palatal and dental defects (Class b, c) or resections that include the orbit (Class IV).[5]

Reconstruction has assured advantages with larger defects, like better results for swallowing and speech. While reconstruction obliterates the defect and restores the facial esthetic, it lacks dental rehabilitation. The prerequisite to examine the

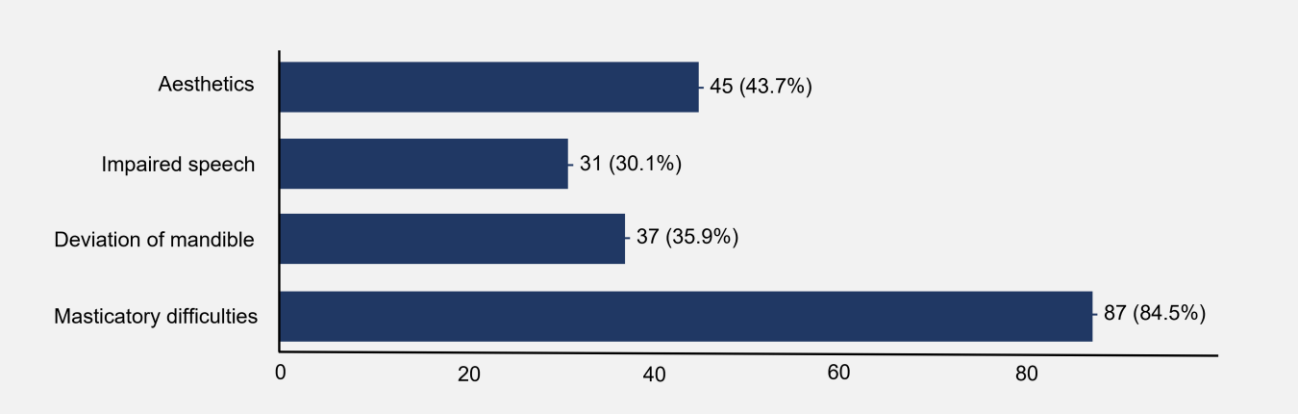

Fig 6. Primary post-mandibulectomy reconstructive requirements of the patients.

maxillectomy defect to detect early recurrence must be weighed against the significant aesthetic and functional benefits of reconstructive surgery.[11] The most used flap for maxillary surgical reconstruction in our study was Temporalis 51%. this is in sync with the literature which also suggests temporalis as the workhorse flap for maxillary reconstruction.[16]

In our study, the most reported modality to reconstruct mandibular defects was vascularized bone grafts. although facilities for performing microvascular surgeries are not available at 37 % of centers. This explains why still 50 % of respondents perform reconstruction of mandibular defects with reconstruction plates or locoregional flaps. Microvascular surgical procedures had brought a revolution in mandibular reconstructive surgery. The common donor sites for vascularized bone grafts are the radial forearm, iliac crest, fibula, and scapula.[8] The fibula is currently the most widespread free flap used for mandibular reconstruction. It can offer up to 30cm of bone length.[17,18]

Speech (64.1%) and nasal regurgitation (62 %) were the two most important functions that the patient demanded to be corrected after maxillectomy whereas after mandibulectomy masticatory difficulties 84% faced by the patient were the primary reason for seeking the prosthesis. This finding is consistent with the previous literature.[19-21]

64 % of respondents appreciated the benefits of implant-supported obturators for maxillectomy patients over conventional obturators but they must decide on this modality considering the affordability of the patient.

Digital technology has lately revolutionized reconstructive surgery by offering more predictable and accurate time-saving reconstruction.[22] Computer assisted surgery, virtual surgical planning and CAD-CAM patient specific implants are few of the digital technology practiced worldwide. Although digital technology shall offer an exciting future for post-ablative jaw reconstruction, in Indian scenario the application is still evolving.[23] A systematic review evaluated the feasibility of intraoral scanners to digitize maxillectomy defects and concluded that few limitations still exist with its use.[24]

CONCLUSION

The findings of this study show lack of awareness among surgeons regarding prosthetic rehabilitation of the post jaw resection patients. Ablative tumors of jaws necessitate a multidisciplinary team approach due to their effects on the functional and esthetic aspects of the patients involved. The response also emphasizes the need for a maxillofacial prosthodontist in the complete rehabilitation of the patients.

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Appendix 1. Maxillectomy questionnaire.

Maxillectomy					
1. How many maxillectomy cases do you treat in a year?	Between 1-5 73.8%	Between 6-10 12.6%	More than 10 13.6%		
2. Do you classify maxillectomy defects for your patients?	Yes 83.5%	No 16.5%			
3. What factors decide your choice between surgical reconstruction and prosthetic rehabilitation?	Size of the lesion 84.5 %	Nature of the lesion 48.5%	Tendency for recurrence 50.5%	Number of remaining teeth 25.2%	
4. What is your choice of flap for maxillary surgical reconstruction?	Radial forearm 16.5%	Temporalis 51.5%	Deep circumflex iliac 4.9%	Scapula 1%	Fibula 13.6%
5. Are your maxillectomy patient seen in a multidisciplinary clinic?	Yes always 32%	Yes sometimes 61%	No never 6.8%		
6. Are the patients dentally rehabilitated following surgical reconstruction?	Yes always 26.2%	Yes sometimes 70.9%	No never 2.9%		
7. Do you use dental implants to rehabilitate a patient's dentition?	Yes 18.4%	No 17.5%	Depending upon the affordability of patients 64.1%		
8. When do you consult with a maxillofacial prosthodontist?	Before surgery 71.8%	After surgery 21.4%	Do not consult 5%		
9. Do you think consulting a maxillofacial prosthodontist before surgery could improve the rehabilitation success rate?	Yes 89.3%	No 2%	May be 8.7%		
10. What improvements could you get by consulting a maxillofacial prosthodontist beforehand?	Preservation of some key teeth for rehabilitation 30%	Better fit of definitive prosthesis if interim/surgical is provided 71%	In deciding whether to reconstruct surgically or rehabilitate prosthetically 53.4%		
11. What is/are the most important oral functions that your patient demand to be corrected after maxillectomy?	Speech 64.1%	Swallowing 47.6%	Mastication 55.3%	Nasal Regurgitation 62.1%	Esthetics 3%

Appendix 2. Mandibulectomy questionnaire.

Mandibulectomy					
1. Do you carry out mandibular resections?	Yes 95.1%	No 4.9%			
2. How many cases of mandibular resections do you do in a year?	Between 1-5 40.8%	Between 6-10 23.3%	More than 10 35.9%		
3. Most often which modality do you use for the reconstruction of mandibular defects?	Primary closure 4.9%	Reconstruction plate 30.1%	Non-vascularised bone grafts 9.7%	Vascularised bone grafts 32%	Loco-regional flap 20.4%
4. Are facilities for vascularized bone grafts available at your center?	Yes 63.1%	No 36.9%			
5. What factors affect your reconstruction plan?	Treatment cost 69%	Age of the patient 62%	Co-morbidity 62%		
6. What is/is the primary demand of the patients which prompts them to opt for a prosthesis after a reconstructive procedure?	Esthetics 43%	Impaired speech 30%	Deviation of mandible 36%	Masticatory difficulties 84.5%	
7. How important is the Quality of Life of a patient?	Not important	Somewhat important	Neutral 5.5%	Important 16.7%	Very important 77.8%
8. Do you often have to weigh between the quality and quantity of resection?	Yes 72.2%	No	May be 27.8%		